

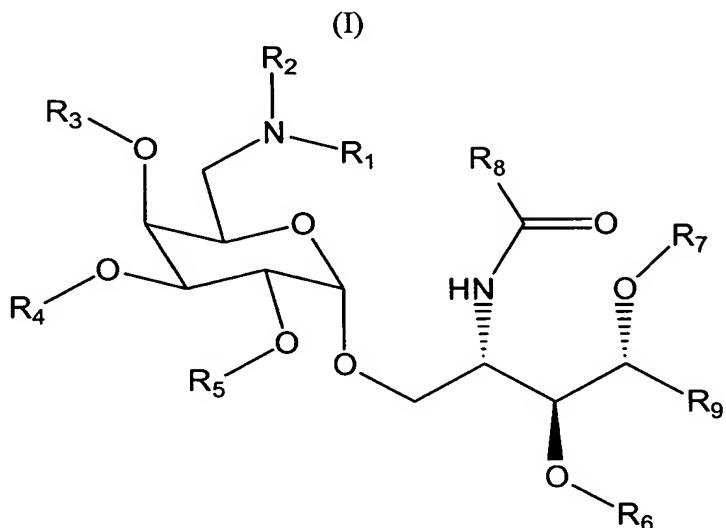
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JC17 Rec'd PCT/PTO 20 SEP 2005

Amendments to the Claims:

This listing of claims replaces all prior versions and listings of claims in the application:

Listing of Claims:

1. (Original) A compound of Formula (I):



wherein,

R<sub>1</sub> is:

- (i) hydrogen; or
- (ii) -SO<sub>2</sub>R<sub>10</sub>,

wherein R<sub>10</sub> is:

halo; hydroxy; OR<sub>11</sub>; OR<sub>12</sub>; amino; NHR<sub>11</sub>; N(R<sub>11</sub>)<sub>2</sub>; NHR<sub>12</sub>; N(R<sub>12</sub>)<sub>2</sub>; aralkylamino;  
or

C<sub>1</sub>-C<sub>12</sub> alkyl optionally substituted with halo, hydroxy, oxo, nitro, OR<sub>11</sub>, OR<sub>12</sub>,  
acyloxy, amino, NHR<sub>11</sub>, N(R<sub>11</sub>)<sub>2</sub>, NHR<sub>12</sub>, N(R<sub>12</sub>)<sub>2</sub>, aralkylamino, mercapto,  
thioalkoxy, S(O)R<sub>11</sub>, S(O)R<sub>12</sub>, SO<sub>2</sub>R<sub>11</sub>, SO<sub>2</sub>R<sub>12</sub>, NHSO<sub>2</sub>R<sub>11</sub>, NHSO<sub>2</sub>R<sub>12</sub>, sulfate,

phosphate, cyano, carboxyl, C(O)R<sub>11</sub>, C(O)R<sub>12</sub>, C(O)OR<sub>11</sub>, C(O)NH<sub>2</sub>, C(O)NHR<sub>11</sub>, C(O)N(R<sub>11</sub>)<sub>2</sub>, C<sub>3</sub>-C<sub>10</sub> cycloalkyl containing 0-3 R<sub>13</sub>, C<sub>3</sub>-C<sub>10</sub> heterocyclyl containing 0-3 R<sub>13</sub>, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>5</sub>-C<sub>10</sub> cycloalkenyl, C<sub>5</sub>-C<sub>10</sub> heterocycloalkenyl, C<sub>6</sub>-C<sub>20</sub> aryl containing 0-3 R<sub>14</sub>, or heteroaryl containing 0-3 R<sub>14</sub>; or C<sub>3</sub>-C<sub>10</sub> cycloalkyl, C<sub>3</sub>-C<sub>10</sub> heterocyclyl, C<sub>5</sub>-C<sub>10</sub> cycloalkenyl, or C<sub>5</sub>-C<sub>10</sub> heterocycloalkenyl optionally substituted with one or more halo, hydroxy, oxo, OR<sub>11</sub>, OR<sub>12</sub>, acyloxy, nitro, amino, NHR<sub>11</sub>, N(R<sub>11</sub>)<sub>2</sub>, NHR<sub>12</sub>, N(R<sub>12</sub>)<sub>2</sub>, aralkylamino, mercapto, thioalkoxy, S(O)R<sub>11</sub>, S(O)R<sub>12</sub>, SO<sub>2</sub>R<sub>11</sub>, SO<sub>2</sub>R<sub>12</sub>, NHSO<sub>2</sub>R<sub>11</sub>, NHSO<sub>2</sub>R<sub>12</sub>, sulfate, phosphate, cyano, carboxyl, C(O)R<sub>11</sub>, C(O)R<sub>12</sub>, C(O)OR<sub>11</sub>, C(O)NH<sub>2</sub>, C(O)NHR<sub>11</sub>, C(O)N(R<sub>11</sub>)<sub>2</sub>, alkyl, haloalkyl, C<sub>3</sub>-C<sub>10</sub> cycloalkyl containing 0-3 R<sub>13</sub>, C<sub>3</sub>-C<sub>10</sub> heterocyclyl containing 0-3 R<sub>13</sub>, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>5</sub>-C<sub>10</sub> cycloalkenyl, C<sub>5</sub>-C<sub>10</sub> heterocycloalkenyl, C<sub>6</sub>-C<sub>20</sub> aryl heteroaryl containing 0-3 R<sub>14</sub>, or C<sub>6</sub>-C<sub>20</sub> heteroaryl containing 0-3 R<sub>14</sub>; or C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, aryl, or heteroaryl optionally substituted with one or more halo, hydroxy, OR<sub>11</sub>, OR<sub>12</sub>, acyloxy, nitro, amino, NHR<sub>11</sub>, N(R<sub>11</sub>)<sub>2</sub>, NHR<sub>12</sub>, N(R<sub>12</sub>)<sub>2</sub>, aralkylamino, mercapto, thioalkoxy, S(O)R<sub>11</sub>, S(O)R<sub>12</sub>, SO<sub>2</sub>R<sub>11</sub>, SO<sub>2</sub>R<sub>12</sub>, NHSO<sub>2</sub>R<sub>11</sub>, NHSO<sub>2</sub>R<sub>12</sub>, sulfate, phosphate, cyano, carboxyl, C(O)R<sub>11</sub>, C(O)R<sub>12</sub>, C(O)OR<sub>11</sub>, C(O)NH<sub>2</sub>, C(O)NHR<sub>11</sub>, C(O)N(R<sub>11</sub>)<sub>2</sub>, alkyl, haloalkyl, C<sub>3</sub>-C<sub>10</sub> cycloalkyl containing 0-3 R<sub>13</sub>, C<sub>3</sub>-C<sub>10</sub> heterocyclyl containing 0-3 R<sub>13</sub>, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>5</sub>-C<sub>10</sub> cycloalkenyl, C<sub>5</sub>-C<sub>10</sub> heterocycloalkenyl, C<sub>6</sub>-C<sub>20</sub> aryl containing 0-3 R<sub>14</sub>, or C<sub>6</sub>-C<sub>20</sub> heteroaryl containing 0-3 R<sub>14</sub>; or (iii) -C(O)R<sub>10</sub>, wherein R<sub>10</sub> is defined as above; or (iv) -C(R<sub>10</sub>)<sub>2</sub>(R<sub>15</sub>), wherein R<sub>10</sub> is defined as above; R<sub>15</sub> is hydrogen, R<sub>10</sub>, or R<sub>15</sub> and R<sub>2</sub> taken together forms a double bond between the carbon and nitrogen atoms to which they are attached; or (v) R<sub>1</sub> and R<sub>2</sub> taken together forms a heterocyclyl of 3-10 ring atoms optionally substituted with R<sub>10</sub>;

R<sub>2</sub> is hydrogen, or R<sub>2</sub> and R<sub>15</sub> taken together forms a double bond between the carbon and nitrogen atoms to which they are attached, or R<sub>2</sub> and R<sub>1</sub> taken together forms a heterocyclyl of 3-10 ring atoms optionally substituted with R<sub>10</sub>;

R<sub>3</sub>, R<sub>4</sub>, R<sub>5</sub>, R<sub>6</sub>, and R<sub>7</sub> are each independently hydrogen, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>6</sub>-C<sub>12</sub> aralkyl, or C<sub>1</sub>-C<sub>6</sub> acyl;

R<sub>8</sub> is -(CH<sub>2</sub>)<sub>x</sub>CH<sub>3</sub>;

R<sub>9</sub> is a linear or branched C<sub>3</sub>-C<sub>100</sub> alkyl;

R<sub>11</sub> is C<sub>1</sub>-C<sub>20</sub> alkyl optionally substituted with halo, hydroxy, alkoxy, amino, alkylamino, dialkylamino, sulfate, or phosphate;

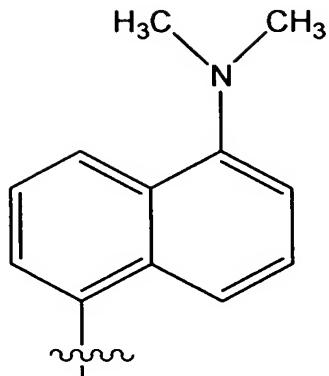
R<sub>12</sub> is aryl optionally substituted with halo, haloalkyl, hydroxy, alkoxy, nitro, amino, alkylamino, dialkylamino, sulfate, or phosphate;

Each R<sub>13</sub> is independently halo, haloalkyl, hydroxy, alkoxy, oxo, amino, alkylamino, dialkylamino, sulfate, or phosphate;

Each R<sub>14</sub> is independently halo, haloalkyl, hydroxy, alkoxy, nitro, amino, alkylamino, dialkylamino, sulfate, or phosphate; and

x is 1-100.

2. (Original) The compound of claim 1 wherein x is 24 and R<sub>9</sub> is *n*-tetradecyl.
3. (Original) The compound of claim 2 wherein R<sub>1</sub> is SO<sub>2</sub>R<sub>10</sub>.
4. (Currently Amended) The compound of claim 3 wherein R<sub>10</sub> is aryl substituted with N(R<sub>11</sub>)<sub>2</sub>[[:]]<sub>z</sub>
5. (Currently Amended) The compound of claim 4 wherein R<sub>10</sub> is:

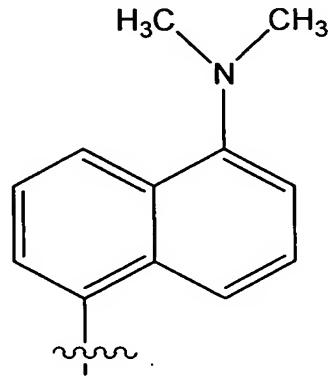


6. (Original) The compound of claim 2 wherein  $\text{R}_1$  is  $\text{C}(\text{O})\text{R}_{10}$ .

7. (Currently Amended) The compound of claim 6 wherein  $\text{R}_{10}$  is  $\text{C}_1\text{-}\text{C}_6$  alkyl substituted with halo, hydroxy, oxo, nitro,  $\text{OR}_{11}$ ,  $\text{OR}_{12}$ , acyloxy, amino,  $\text{NHR}_{11}$ ,  $\text{N}(\text{R}_{11})_2$ ,  $\text{NHR}_{12}$ ,  $\text{N}(\text{R}_{12})_2$ , aralkylamino, mercapto, thioalkoxy,  $\text{S(O)R}_{11}$ ,  $\text{S(O)R}_{12}$ ,  $\text{SO}_2\text{R}_{11}$ ,  $\text{SO}_2\text{R}_{12}$ ,  $\text{NSO}_2\text{R}_{11}$ ,  $\text{NSO}_2\text{R}_{12}$ , sulfate, phosphate, cyano, carboxyl,  $\text{C}(\text{O})\text{R}_{11}$ ,  $\text{C}(\text{O})\text{R}_{12}$ ,  $\text{C}(\text{O})\text{OR}_{11}$ ,  $\text{C}(\text{O})\text{NH}_2$ ,  $\text{C}(\text{O})\text{NHR}_{11}$ ,  $\text{C}(\text{O})\text{N}(\text{R}_{11})_2$ ,  $\text{C}_3\text{-}\text{C}_{10}$  cycloalkyl containing 0-3  $\text{R}_{13}$ ,  $\text{C}_3\text{-}\text{C}_{10}$  heterocyclyl containing 0-3  $\text{R}_{13}$ ,  $\text{C}_2\text{-}\text{C}_6$  alkenyl,  $\text{C}_2\text{-}\text{C}_6$  alkynyl,  $\text{C}_5\text{-}\text{C}_{10}$  cycloalkenyl,  $\text{C}_5\text{-}\text{C}_{10}$  heterocycloalkenyl,  $\text{C}_6\text{-}\text{C}_{20}$  aryl containing 0-3  $\text{R}_{14}$ , or  $\text{C}_6\text{-}\text{C}_{20}$  heteroaryl containing 0-3  $\text{R}_{14}[[;]]$ .

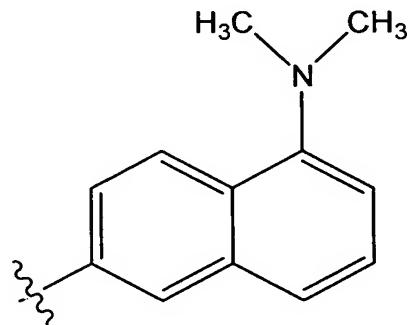
8. (Original) The compound of claim 7 wherein  $\text{R}_{10}$  is  $\text{C}_1\text{-}\text{C}_6$  alkyl substituted with  $\text{NSO}_2\text{R}_{12}$ .

9. (Currently Amended) The compound of claim 8 wherein R<sub>12</sub> is:



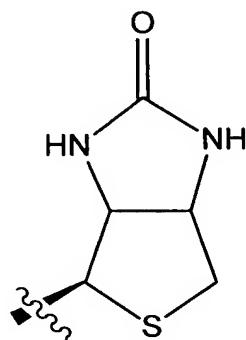
10. (Original) The compound of claim 7, wherein R<sub>10</sub> is alkyl substituted with C(O)R<sub>12</sub>.

11. (Currently Amended) The compound of claim 10 wherein R<sub>12</sub> is:

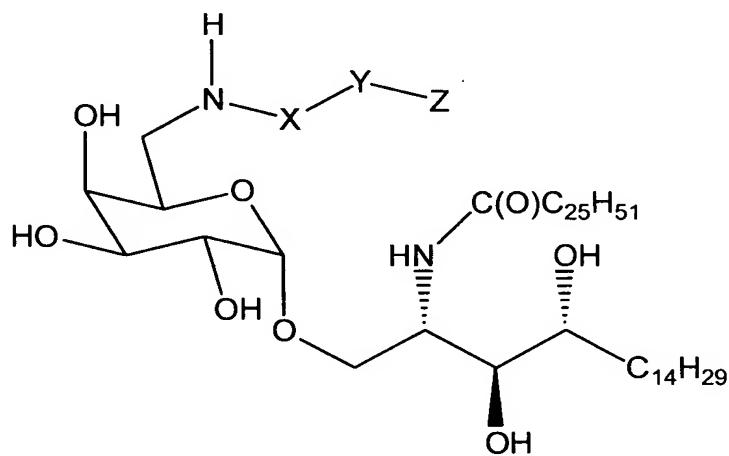


12. (Original) The compound of claim 7 wherein R<sub>10</sub> is alkyl is substituted with C<sub>5</sub>-C<sub>10</sub> heterocyclyl containing 0-3 R<sub>13</sub>.

13. (Currently Amended) The compound of claim 12 wherein the heterocyclil is:



14. (Original) A probe for observing glycolipid association with CD1d and NKT cell receptors during NKT cell stimulation comprising a compound of Formula (II):



wherein:

X is  $-\text{SO}_2-$ ,  $-\text{C}(\text{O})-$ , or absent;

Y is a linker group; and

Z is a reporter group.

15. (Original) A method of quantifying glycolipid association with CD1d and NKT cell receptors during NKT cell stimulation comprising: (i) contacting a compound of Formula (II) with a CD1d protein; (ii) allowing the compound to associate with the CD1d protein; (iii) measuring fluorescence emitted by the compound during steps (i) and (ii) to provide one or more pre-NKT cell contact fluorescence measurements; (iv) contacting the compound and CD1d protein with an NKT cell line; (v) measuring fluorescence emitted by the compound during step (iv) to provide one or more NKT cell contact fluorescence measurements.

16. (Original) The method of claim 15 wherein step (v) is repeated over time.

17. (Original) The method of claim 15 further comprising the step of comparing the fluorescence measurements in steps (iii) and (v).

18. (Original) A method of stimulating NKT cells comprising contacting an NKT cell with a compound of Formula (I) and a CD1 protein.

19. (Original) The method of claim 18 wherein the protein is CD1d.

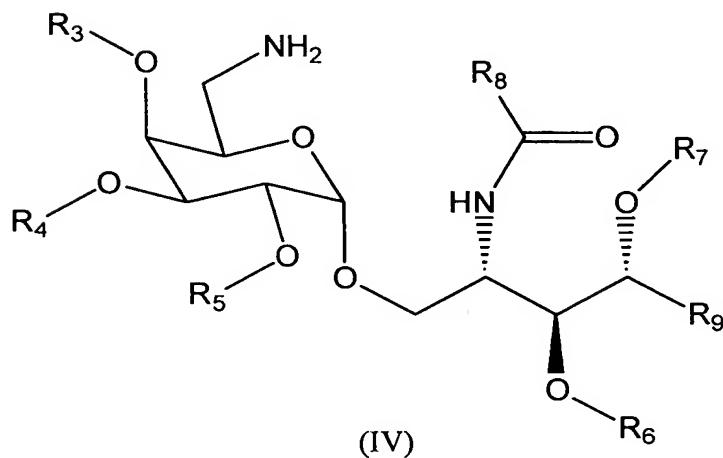
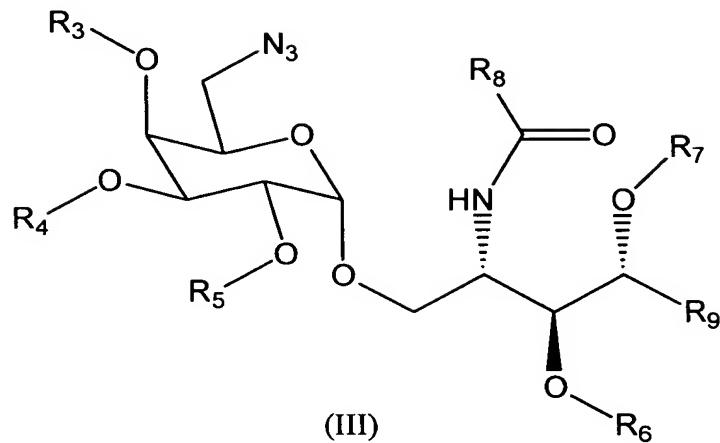
20. (Original) A method of stimulating the immune system of a subject in need of such stimulation, the method comprising administering a compound of Formula (I) to the subject.

21. (Original) A method of treating an autoimmune disease in a subject in need of such treatment, the method comprising administering an effective amount of a compound of Formula (I).

22. (Currently Amended) The method of claim 20-~~or~~ 21 wherein the subject is a mammal.

23. (Original) The method of claim 22 wherein the subject is a human.

24. (Original) A method of making a compound of Formula (I) comprising: (i) converting a compound of Formula (III) to a compound of Formula (IV):



and (ii) contacting a compound of Formula (IV) with  $R_1\text{-LG}$  to afford a compound of Formula (I), wherein:

$R_1$  is:

(i)  $-\text{SO}_2\text{R}_{10}$ ,

wherein  $\text{R}_{10}$  is:

halo; hydroxy;  $\text{OR}_{11}$ ;  $\text{OR}_{12}$ ; amino;  $\text{NHR}_{11}$ ;  $\text{N}(\text{R}_{11})_2$ ;  $\text{NHR}_{12}$ ;  $\text{N}(\text{R}_{12})_2$ ; aralkylamino;

or

C<sub>1</sub>-C<sub>12</sub> alkyl optionally substituted with halo, hydroxy, oxo, nitro, OR<sub>11</sub>, OR<sub>12</sub>, acyloxy, amino, NHR<sub>11</sub>, N(R<sub>11</sub>)<sub>2</sub>, NHR<sub>12</sub>, N(R<sub>12</sub>)<sub>2</sub>, aralkylamino, mercapto, thioalkoxy, S(O)R<sub>11</sub>, S(O)R<sub>12</sub>, SO<sub>2</sub>R<sub>11</sub>, SO<sub>2</sub>R<sub>12</sub>, NSO<sub>2</sub>R<sub>11</sub>, NSO<sub>2</sub>R<sub>12</sub>, sulfate, phosphate, cyano, carboxyl, C(O)R<sub>11</sub>, C(O)R<sub>12</sub>, C(O)OR<sub>11</sub>, C(O)NH<sub>2</sub>, C(O)NHR<sub>11</sub>, C(O)N(R<sub>11</sub>)<sub>2</sub>, C<sub>3</sub>-C<sub>10</sub> cycloalkyl containing 0-3 R<sub>13</sub>, C<sub>3</sub>-C<sub>10</sub> heterocyclyl containing 0-3 R<sub>13</sub>, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>5</sub>-C<sub>10</sub> cycloalkenyl, C<sub>5</sub>-C<sub>10</sub> heterocycloalkenyl, C<sub>6</sub>-C<sub>20</sub> aryl containing 0-3 R<sub>14</sub>, or C<sub>6</sub>-C<sub>20</sub> heteroaryl containing 0-3 R<sub>14</sub>; or C<sub>3</sub>-C<sub>10</sub> cycloalkyl, C<sub>3</sub>-C<sub>10</sub> heterocyclyl, C<sub>5</sub>-C<sub>10</sub> cycloalkenyl, or C<sub>5</sub>-C<sub>10</sub> heterocycloalkenyl optionally substituted with one or more halo, hydroxy, oxo, OR<sub>11</sub>, OR<sub>12</sub>, acyloxy, nitro, amino, NHR<sub>11</sub>, N(R<sub>11</sub>)<sub>2</sub>, NHR<sub>12</sub>, N(R<sub>12</sub>)<sub>2</sub>, aralkylamino, mercapto, thioalkoxy, S(O)R<sub>11</sub>, S(O)R<sub>12</sub>, SO<sub>2</sub>R<sub>11</sub>, SO<sub>2</sub>R<sub>12</sub>, NSO<sub>2</sub>R<sub>11</sub>, NSO<sub>2</sub>R<sub>12</sub>, sulfate, phosphate, cyano, carboxyl, C(O)R<sub>11</sub>, C(O)R<sub>12</sub>, C(O)OR<sub>11</sub>, C(O)NH<sub>2</sub>, C(O)NHR<sub>11</sub>, C(O)N(R<sub>11</sub>)<sub>2</sub>, alkyl, haloalkyl, C<sub>3</sub>-C<sub>10</sub> cycloalkyl containing 0-3 R<sub>13</sub>, C<sub>3</sub>-C<sub>10</sub> heterocyclyl containing 0-3 R<sub>13</sub>, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>5</sub>-C<sub>10</sub> cycloalkenyl, C<sub>5</sub>-C<sub>10</sub> heterocycloalkenyl, C<sub>6</sub>-C<sub>20</sub> aryl containing 0-3 R<sub>14</sub>, or C<sub>6</sub>-C<sub>20</sub> heteroaryl containing 0-3 R<sub>14</sub>; or C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, aryl, or heteroaryl optionally substituted with one or more halo, hydroxy, OR<sub>11</sub>, OR<sub>12</sub>, acyloxy, nitro, amino, NHR<sub>11</sub>, N(R<sub>11</sub>)<sub>2</sub>, NHR<sub>12</sub>, N(R<sub>12</sub>)<sub>2</sub>, aralkylamino, mercapto, thioalkoxy, S(O)R<sub>11</sub>, S(O)R<sub>12</sub>, SO<sub>2</sub>R<sub>11</sub>, SO<sub>2</sub>R<sub>12</sub>, NSO<sub>2</sub>R<sub>11</sub>, NSO<sub>2</sub>R<sub>12</sub>, sulfate, phosphate, cyano, carboxyl, C(O)R<sub>11</sub>, C(O)R<sub>12</sub>, C(O)OR<sub>11</sub>, C(O)NH<sub>2</sub>, C(O)NHR<sub>11</sub>, C(O)N(R<sub>11</sub>)<sub>2</sub>, alkyl, haloalkyl, C<sub>3</sub>-C<sub>10</sub> cycloalkyl containing 0-3 R<sub>13</sub>, C<sub>3</sub>-C<sub>10</sub> heterocyclyl containing 0-3 R<sub>13</sub>, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>6</sub> alkynyl, C<sub>5</sub>-C<sub>10</sub> cycloalkenyl, C<sub>5</sub>-C<sub>10</sub> heterocycloalkenyl, C<sub>6</sub>-C<sub>20</sub> aryl containing 0-3 R<sub>14</sub>, or C<sub>6</sub>-C<sub>20</sub> heteroaryl containing 0-3 R<sub>14</sub>; or (ii) -C(O)R<sub>10</sub>, wherein R<sub>10</sub> is defined as above; or (iii) -C(R<sub>10</sub>)<sub>2</sub>(R<sub>15</sub>), wherein R<sub>10</sub> is defined as above; R<sub>15</sub> is hydrogen, R<sub>10</sub>, or R<sub>15</sub> and R<sub>2</sub> taken together forms a double bond between the carbon and nitrogen atoms to which they are attached; or

R<sub>3</sub>, R<sub>4</sub>, R<sub>5</sub>, R<sub>6</sub>, and R<sub>7</sub> are each independently hydrogen, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>6</sub>-C<sub>12</sub> aralkyl, or C<sub>1</sub>-C<sub>6</sub> acyl;

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R<sub>8</sub> is -(CH<sub>2</sub>)<sub>x</sub>CH<sub>3</sub>;

R<sub>9</sub> is a linear or branched C<sub>3</sub>-C<sub>100</sub> alkyl;

R<sub>11</sub> is C<sub>1</sub>-C<sub>20</sub> alkyl optionally substituted with halo, hydroxy, alkoxy, amino, alkylamino, dialkylamino, sulfate, or phosphate;

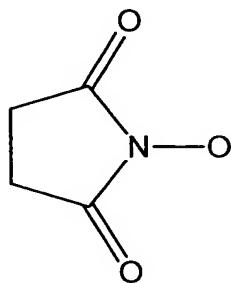
R<sub>12</sub> is aryl optionally substituted with halo, haloalkyl, hydroxy, alkoxy, nitro, amino, alkylamino, dialkylamino, sulfate, or phosphate;

Each R<sub>13</sub> is independently halo, haloalkyl, hydroxy, alkoxy, oxo, amino, alkylamino, dialkylamino, sulfate, or phosphate;

Each R<sub>14</sub> is independently halo, haloalkyl, hydroxy, alkoxy, nitro, amino, alkylamino, dialkylamino, sulfate, or phosphate;

x is 1-100;

LG is halo, -OSO<sub>2</sub>R<sub>16</sub>, B(OH)<sub>2</sub>, or



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; and

R<sub>16</sub> is alkyl, haloalkyl or aryl optionally substituted with alkyl, halo or nitro.

25. (Currently Amended) A pharmaceutical ~~composition~~ composition comprising a compound of Formula (I) and a pharmaceutically acceptable carrier.